



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,038	08/20/2003	Michael E. Dobbs	ITDE-PACD110US	5077
23122	7590	08/19/2005	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980			STAFIRA, MICHAEL PATRICK	
			ART UNIT	PAPER NUMBER
			2877	
DATE MAILED: 08/19/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

HA

**Office Action Summary**

Application No.

10/644,038

Applicant(s)

DOBBS ET AL.

Examiner

Michael P. Stafira

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-14 and 17-21 is/are rejected.
- 7) ☒ Claim(s) 6, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 4/13/2005.
- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the second reference signal must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 2877

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 10 it is unclear how one receives a first reference signal or a second reference signal when the reference source is not previously defined in the claims. Does the first reference signal or second reference signal come from the lock-in technique?

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

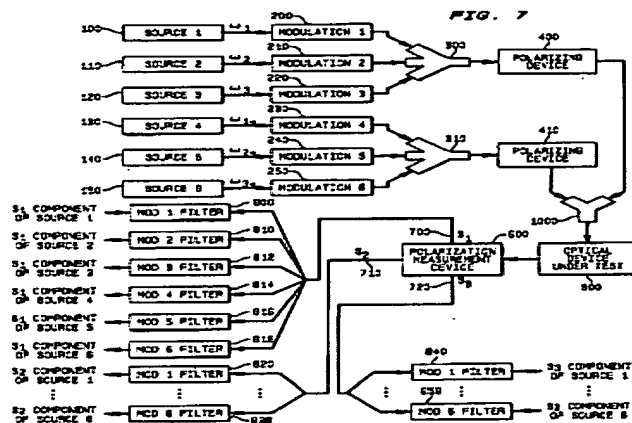
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jopson et al. ('450) in view of Chou et al. ('037).

#### **Claim 1**

Jopson et al. ('450) discloses a first source (Fig. 7, ref. 100) configured to emit first optical radiation with a first polarization (Fig. 7, Ref. 400) and that varies at a first frequency; a second source (Fig. 7, Ref. 110) configured to emit second optical radiation with a second polarization (Fig. 7, Ref. 400) and that varies at a second frequency; a detector (Fig. 7, Ref. 600) configured to detect the first and second optical radiation after interaction with the sample (Fig. 7, Ref. 500) and generate a detection signal (Fig. 7, Ref. S1-S3).

Art Unit: 2877



Jopson et al. ('450) substantially teaches the claimed invention except that it does not show a first or second lock-in amplifier to produce a first and second output signal. Chou et al. ('037) shows that it is known to provide a lock-in amplifier for multiple frequencies, which produce a first and second signals (Fig. 1, Ref. 21) for an optical measuring device. It would have been obvious to combine the device of Jopson et al. ('450) with the lock-in amplifier of Chou et al. ('037) for the purpose of providing a measure of amplitude and phase of signals buried in noise, therefore increasing the sensitivity of the measurement.

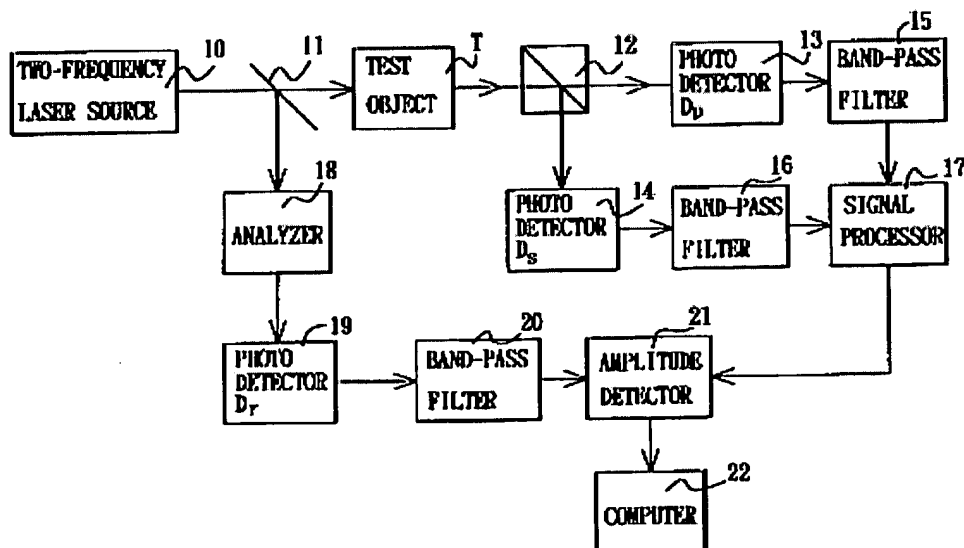


FIG. 1

Art Unit: 2877

**Claim 2**

Jopson et al. ('450) further discloses the first source includes: a laser (Fig. 7, Ref. 7) configured to emit radiation, a modulator (Fig. 7, Ref. 200) configured to modulate the radiation at the first frequency, and a polarizer (Fig. 7, Ref. 400) configured to impart the first polarization to the radiation.

**Claim 3**

Jopson et al. ('450) further the second source includes: a laser (Fig. 7, Ref. 110) configured to emit radiation, a modulator (Fig. 7, Ref. 210) configured to modulate the radiation at the second frequency, and a polarizer (Fig. 7, Ref. 400) configured to impart the second polarization to the radiation.

**Claim 4**

The reference of Jopson et al. ('450) further discloses a third source (Fig. 7, Ref. 120) configured to emit third optical radiation with a third polarization (Fig. 7, Ref. 400) and that varies at a third frequency.

Jopson et al. ('450) substantially teaches the claimed invention except that it does not show a third lock-in amplifier to produce a third output signal. Chou et al. ('037) shows that it is known to provide a lock-in amplifier for multiple frequencies, which produce an output signals (Fig. 1, Ref. 21) for an optical measuring device. It would have been obvious to combine the device of Jopson et al. ('450) with the lock-in amplifier of Chou et al. ('037) for the purpose of providing a measure of amplitude and phase of signals buried in noise, therefore increasing the sensitivity of the measurement.

Art Unit: 2877

**Claim 5**

Jopson et al. ('450) further discloses a processor (Fig. 1, Ref. 60) configured to process the first output signal and the second output signal to obtain polarization information relating to the sample (Col. 2, lines 19-38).

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7, 8, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Jopson et al. ('450).

**Claim 7**

Jopson et al. ('450) discloses transmitting a first beam (Fig. 7, Ref. 100) of optical radiation toward the sample (Fig. 7, Ref. 500), the first beam having a first polarization (Fig. 7, Ref. 400) and an amplitude varying at a first frequency; transmitting a second beam (Fig. 7, Ref. 110) of optical radiation toward the sample (Fig. 7, Ref. 500), the second beam having a second polarization (Fig. 7, Ref. 400) different from the first polarization and an amplitude (Fig. 7, Ref. 200, 210) varying at a second frequency different from the first frequency; detecting (Fig. 7, Ref. 600) the first and second beams of optical radiation after interaction with the sample (Fig. 7, Ref. 500) to produce a detection signal; determining a first portion of the detection signal that is present at the first frequency; determining a second portion of the detection signal that is present at the second frequency; and obtaining polarization information about the sample based on the

Art Unit: 2877

first portion of the detection signal and the second portion of the detection signal (Col. 3, lines 1-20).

**Claim 8**

Jopson et al. ('450) further discloses generating first optical radiation (Fig. 7, Ref. 100); modulating the first optical radiation at the first frequency to obtain modulated radiation (Fig. 7, Ref. 200); and polarizing (Fig. 7, Ref. 400) the modulated radiation to obtain the first beam of optical radiation.

**Claim 11**

Jopson et al. ('450) further discloses the polarization information about the sample includes optical power from the sample at the first polarization and optical power from the sample at the second polarization (Col. 4, lines 51-67).

4. Claims 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jopson et al. ('450).

**Claim 9**

Jopson et al. ('450) discloses the claimed invention except for amplifying the modulated radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Jopson et al. ('450) with the amplifier since it was well known in the art that using an amplifier after modulation increases the optical power of the radiation, therefore allowing the radiation to penetrate dense objects.



Art Unit: 2877

5. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jopson et al. ('450) in view of Chou et al. ('037).

#### **Claim 12**

Jopson et al. ('450) further discloses a plurality of sources (Fig. 7, Ref. 100, 110) configured to emit optical radiation, each one of the plurality of sources (Fig. 7, Ref. 100, 110) being configured to emit radiation at a different frequency and a different polarization (Fig. 7, Ref. 400) from other ones of the plurality of sources (Fig. 7, Ref. 100, 110); a single detector (Fig. 7, Ref. 600) configured to detect the optical radiation from the plurality of sources after interaction with the sample and generate a detection signal (Col. 4, lines 51-67).

Jopson et al. ('450) substantially teaches the claimed invention except that it does not show a plurality of lock-in amplifier to produce a output signal. Chou et al. ('037) shows that it is known to provide a lock-in amplifier for multiple frequencies, which produce signals (Fig. 1, Ref. 21) for an optical measuring device. It would have been obvious to combine the device of Jopson et al. ('450) with the lock-in amplifier of Chou et al. ('037) for the purpose of providing a measure of amplitude and phase of signals buried in noise, therefore increasing the sensitivity of the measurement.

#### **Claim 13**

Jopson et al. ('450) discloses the plurality of sources includes at least four sources (Fig. 7, Ref. 100, 110, 120, 130).

Jopson et al. ('450) substantially teaches the claimed invention except that it does not show a corresponding lock-in amplifier to produce a output signal. Chou et al. ('037) shows that it is known to provide a lock-in amplifier for multiple frequencies, which produce signal (Fig. 1,

Art Unit: 2877

Ref. 21) for an optical measuring device. It would have been obvious to combine the device of Jopson et al. ('450) with the lock-in amplifier of Chou et al. ('037) for the purpose of providing a measure of amplitude and phase of signals buried in noise, therefore increasing the sensitivity of the measurement.

#### **Claim 14**

Jopson et al. ('450) further discloses the single detector includes a focal plane array, and wherein the components of the detection signal include a plurality of images at the different polarizations (Fig. 7, Ref. 600).

6. Claims 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Jopson et al. ('450).

#### **Claim 17**

Jopson et al. ('450) discloses generating a first beam of optical radiation (Fig. 7, ref. 100) that is modulated (Fig. 7, Ref. 200) at a first frequency and polarized at a first polarization (Fig. 7, Ref. 400); generating a second beam of optical radiation (Fig. 7, Ref. 110) that is modulated (Fig. 7, Ref. 210) at a second frequency and polarized at a second polarization (Fig. 7, Ref. 400); transmitting the first and second beams of optical radiation to the target (Fig. 7, Ref. 500); and detecting radiation at the first polarization and radiation at the second polarization from the target using a phase sensitive technique and the first and second frequencies (Fig. 7, Ref. 600).

#### **Claim 18**

Jopson et al. ('450) further discloses converting optical radiation into an electrical detection signal, performing the phase sensitive technique on the electrical detection signal using

Art Unit: 2877

the first frequency to detect the radiation at the first polarization, and performing the phase sensitive technique on the electrical detection signal using the second frequency to detect the radiation at the second polarization (Col. 4, lines 25-67).

**Claim 19**

Jopson et al. ('450) further discloses emitting first optical radiation (Fig. 7, Ref. 100); modulating the first optical radiation at the first frequency to obtain modulated radiation (Fig. 7, Ref. 200); and polarizing (Fig. 7, Ref. 400) the modulated radiation at the first polarization to obtain the first beam of optical radiation.

**Claim 20**

The reference of Jopson et al. ('450) further discloses emitting second optical radiation (Fig. 7, Ref. 110); modulating the second optical radiation at the second frequency to obtain modulated radiation (Fig. 7, Ref. 210); and polarizing the modulated radiation at the second polarization to obtain the second beam of optical radiation (Fig. 7, Ref. 400).

**Claim 21**

Jopson et al. ('450) discloses means for generating a plurality of differently-polarized signals respectively varying at different frequencies (Fig. 7, Ref. 100, 110, 200, 210, 400); and means for detecting optical radiation at the different frequencies using a phase sensitive technique after the optical signal has interacted with the sample (Fig. 7, Ref. 600).

Art Unit: 2877


*Allowable Subject Matter*

7. Claims 6, 15, 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Michael P. Stafira  
Primary Examiner  
Art Unit 2877

August 18, 2005